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THE NECKS OF THE SAUROPTERYGIA.—It is known that the length of the neck in the Plesiosauroid reptiles of North America diminished in length as the group approached the period of extinction. Thus the longest necks in the order, those of the species of *Elasmosaurus*, are seen in the Niobrara (No. 3) division of the cretaceous. In the Pierre formation (No. 4), we find the shorter-necked *Elasmosauri*, and the *Cimoliasauri* with still shorter necks. In the latest cretaceous (Fox Hills or No. 5), the neck is reduced to its most abbreviated proportions, in the genus *Uronautes*. This shortening of the neck is thus associated with the shallowing of the water, which, as we know, gradually succeeded the deep-sea period of the Niobrara. In Europe the history of the order during the Jurassic period was the same. During the deep-sea epoch of the Lias we have the typical *Plesiosauri* represented by the long-necked *P. dolichodirus*; the shallower Oxford and Kimmeridge seas were the range of the shorter-necked *Muraenosaurus*; while *Pliosaurus*, with the shortest neck, was contemporary with these, and remained as late as the Portland. It is true, that long-necked forms continued as late as the Kimmeridge in England (*Colymbosaurus*). It has yet to be ascertained whether the European cretaceous Sauropterygia present the succession seen in those of North America.—*E. D. Cope*.

THE SCALES OF LIODON.—Professor SNOW, of Lawrence, Kansas, has recently observed the scales of the abdominal surface of *Liodon dyspelor*. He states them to be smaller than those of the rattlesnake. Prof. SNOW has also obtained a complete fore-limb of this species, and gives a figure of it in the Kansas City *Review of Science and Industry*.

THE FOSSIL INSECTS OF THE GREEN RIVER SHALES.—Mr. S. H. Scudder gives a series of descriptions of the insects obtained from the shales near Green River City, Wyoming, in the 4th volume of the *Bulletin* of the Hayden Survey. They represent the orders as follows: *Hymenoptera*, 4 sp.; *Diptera*, 14; *Coleoptera*, 37; *Hemiptera*, 12; *Orthoptera*, 2; *Neuroptera*, 2; total, 71. Then there are a few species of *Myriapoda* and *Arachnida*. Two new generic types of *Diptera* and one of *Hemiptera* are described.

#### GEOGRAPHY AND TRAVELS.<sup>1</sup>

THE SWEDISH ARCTIC EXPEDITION.—In the year 1556 Burrough discovered the strait leading into the Kara Sea, between Novaya Zemlya and the island of Waigatz; and in 1580 Pett sailed through the channel which separates Waigatz from the mainland, into the sea, where his further progress was barred by the ice. In 1595 the famous Dutch explorer, Willem Barentz, also reached the entrance to the sea. During the last century the Russians made several attempts to cross the sea, and in 1738 expeditions reached

<sup>1</sup> Edited by ELLIS H. YARNALL, Philadelphia.

the mouths of the Obi, Yenisei, and Pyasina rivers. In 1869 the Norwegian Captains Carlsen and Palliser sailed through the sea of Kara, and since that year the Norwegian fishermen have annually visited it in their pursuit of the seal and the walrus. In 1874 Captain Wiggins sailed from Dundee, and passing through the Waigatz straits, cruised along the Yalmal peninsula, and was able to advance as far as the gulf of Obi. On another voyage, in 1876, reaching the mouth of the Yenisei, he sailed up that stream as far as Kureika, where he left his vessel for the winter and returned overland. His observations demonstrated that the Gulf Stream flows into this sea. While, in July and August, in the same latitudes in Davis' straits and east Greenland, the surface-water is never above  $33^{\circ}$  to  $34^{\circ}$ , in the straits of Waigatz the temperature was as high as  $50^{\circ}$ , and from  $48^{\circ}$  to  $49^{\circ}$  in the sea of Kara.<sup>1</sup>

The knowledge thus obtained of the navigability, at certain seasons, of these waters, induced some wealthy Norwegians and Russian merchants to endeavor to open up a route to the mouths of the great rivers Obi and Yenisei, which penetrate some 2,500 miles into the heart of Siberia, and thus provide a new outlet for the mineral wealth of the Ural mountains, the fur and fish of the northern and the produce of the immense forests and agricultural districts of central and southern Siberia.

Mr. Oscar Dickson, of Gothenburg, a munificent and intelligent promoter of Arctic discovery, accordingly fitted out an expedition which sailed from Tromsø in June, 1875, under the command of Prof. Nordenskiöld. This gentleman was already a veteran explorer, having been engaged in six Arctic expeditions (five to Spitzbergen and one to Greenland), made two important spring sledging journeys, and experienced the rigors of a winter north of the 80th parallel, while his scientific attainments were of the highest order. Passing through the Yugor strait and crossing the sea of Kara, he reached a point on the eastern side of the mouth of the Yenisei, which was named Dickson Harbor, from whence he returned homewards.

In 1876 Mr. Dickson, aided by M. Alexander Sibeirakoff, a wealthy Russian, again dispatched Nordenskiöld, who, leaving Tromsø on the 25th of July, after some delays by the ice, again reached the mouth of the Yenisei, and ascended it to Mesenkin, from whence he returned, arriving at Tromsø on the 22d of September.<sup>2</sup>

The success of these two voyages induced Prof. Nordenskiöld to plan his present expedition round Cape Chelyuskin, along the Siberian coast to the straits of Behring. He believed that during September he would find open water all along the coast to Cape Chelyuskin. The rivers Obi, Irtish, and Yenisei send a vast vol-

<sup>1</sup> See *Geographical Magazine*, March, 1877.

<sup>2</sup> Petermann's *Mittheilungen*, 1877, Part II., p. 54.

ume of warm water into the ocean in the month of August, which would, from the effect of the rotation of the earth exercised on streams running north or south in high latitudes, be driven to the eastward, and open a channel along the coast.

Heretofore no vessel has succeeded in doubling Cape Chelyuskin. Between the years 1735 and 1740, the expeditions sent out by the Russian government surveyed portions of the coast, and their vessels reached the mouths of the Pyasina on the west, and of the Khatanga on the east side of Cape Chelyuskin; but it was not until 1742 that Mate Chelyuskin discovered the northernmost point of Asia when on a sledge journey. From the Lena to Behring's straits more is known of the coast, but the expeditions were made in small sailing vessels, and passed over, in most cases, but small portions of the coast line. In 1728 Behring visited the straits now called after him; in 1770 the New Siberian islands were discovered; and in 1778 Captain Cook reached the 180th degree of longitude. Our best accounts of this region are derived from the explorations of the Russian Admirals Wrangell and Anjou, in 1820, '21, '22, and '23. Kellett Land and Herald island were discovered by the British in 1849, and in 1855 the United States expedition under Captain, now Admiral, Rodgers, reached the 176th degree of longitude. In 1867 Captain Long, in an American whaling vessel, got as far as 170° E.

At present, says the *Geographical Magazine*, August, 1878, we have no knowledge of the vegetable and animal life (consisting of survivals from the glacial period) in the sea which washes the north coast of Siberia, yet a complete and certain knowledge of what animal types are of glacial and what of Atlantic origin, is of the greatest importance, not only for zoölogy and for a knowledge of the geographical distribution of animals, but also as regards the geology of Scandinavia. Our knowledge of the animal and vegetable types which lived at the same time with the mammoth is exceedingly incomplete.<sup>1</sup>

Influenced by all these considerations, the Swedish government and the King and M. Sibeirakoff together contributed £8,000, to which Mr. Dickson added £12,000, to fit out the present expedition. The *Vega*, a very strong steamer of 300 tons, was purchased, and supplied with from two to three years' provisions, coal sufficient to steam 8,000 nautical miles, and a steam launch. The names of the officers of the *Vega* are: Prof. Nordenskiöld; Captain Pallander, commander (who has had much experience in Arctic voyages); Doctors Kjellmann, Stuxberg, and Almgvist, Scientific staff; Lieut. Hovgaard, Danish Navy; Lieut. Brusevitz, Swedish Navy; Lieut. Bove, Italian Navy; and Lieut. Nordqvist, a Finnish officer and geologist. The crew consists of eighteen seamen and three hunters.

The *Vega* departed from Tromsø July 21, 1878, and arrived at

<sup>1</sup> See also Petermann's *Mittheilungen*, 1878, Part 2, p. 67.

Habarowa, a Russian hunting-place in the Yugor straits, on the 30th. She was accompanied by a small steamer, the *Lena*, and also by the steamer *Fraser*, having a sailing vessel, the *Express*, all employed by M. Sibeirakoff, to open maritime commerce with Siberia. During their short stay here collections were made of the fauna of the sea and the flora of the land. Many specimens of fish were obtained, and special attention devoted to the morphology and development of the phænogamous plants. Habarowa is inhabited in the summer by nine Russians, who live in wooden, turf-covered cabins, while the native Samœides have tents of reindeer skin. Dr. Nordenskiöld purchased some of the native costumes, and, after some difficulty, specimens of their "gods." These objects of veneration resemble the rude rag dolls of children, and are of stone or wood, dressed in fur and fine rags, with pearl ornaments. Sacrifices of bears, reindeers, etc., are made.

The island of Waigatz is a plateau about 90 kilometres long by 40 broad. The Silurian and limestone beds contain many fossils. Leaving Habarowa on the first of August, the *Vega* sailed slowly (to allow time for dredging) across the Karian sea, while the *Lena* was sent to examine the Beli strait, which separates White island from the Yalmal peninsula. Some fields of rotten ice were encountered but fog proved the only hindrance, and they reached Dickson Harbor on the 6th of August. Prof. Nordenskiöld speaks of this harbor as safe and commodious, and as promising to become the chief port for the export of Siberian products. In geological formation, the land resembles Spitzbergen. In consequence of the inferior saltness of the water, there is little animal life. Three white bears were shot.<sup>1</sup>

After a careful survey of Dickson Harbor, and adding to her supplies the coal and provisions brought so far by the *Express*, the *Vega*, still accompanied by the *Lena*, continued her voyage on the 10th. Further information of the expedition is given in a letter of Prof. Nordenskiöld's in the *New York Herald*, and in accounts in various European journals. On the 11th of August they passed Cape Sterlegoff, the furthest point ever reached by a vessel. They soon perceived the charts to be entirely wrong, the coast being far more to the west than supposed, and numerous islands not given were met. The fog caused much embarrassment, but the ice did not often give them much trouble. The saltness of the water increased and the temperature fell, while the organic life at the sea-bottom became richer, and fine specimens of the remarkable crinoid *Allecto eschrichtii*, starfish, and large ocean Algæ were obtained. On shore the higher fauna and flora were very poor. Snow sparrows, several species of wading birds, and some varieties of geese were found. Occasionally scenes of great beauty were presented when the sea was smooth and clear; the

<sup>1</sup> See Prof. Nordenskiöld's letter from Dickson's Harbor in Petermann's *Mittheilungen*, 1878, Part xi, p. 430. Also letter of Lieut. Hovgaard's, from same place, in *Verhandlungen der Gesellschaft für Erakunde zu Berlin*, 1878, p. 198.

midnight sun hung low over the horizon, and to the south the Taimyr land glittered fiery red in its rays, while the cliffs and castles of ice stood colored blue, purple, crimson, and silver-white. Over this scene lay a stillness which sent a man's voice miles and miles away, and the scratch of the bears walking over the ice-blocks was heard afar off. Waiting for clear weather, they lay at anchor, from the 14th to the 18th, in a small bay in the sound between the island of Taimyr and the continent. This haven was named Actinia Port, and would be a favorable position for one of Weyprecht's proposed meteorological stations. The land here was free from snow, and covered with a gray-green carpet of grass, mosses, and lichens. On the 18th, the fog still continuing, they set sail, and in spite of fog and some large masses of ice, passed Cape Chelyuskin on the 19th, with flags waving and guns firing a salute. Cape Chelyuskin is a low promontory, divided into two parts by the bay in which the vessels anchored. The west cape is in  $77^{\circ} 36' 37''$  N. lat. and  $103^{\circ} 25' 5''$  E. long., and the east cape is in N. lat.  $77^{\circ} 41'$  and E. long.  $104^{\circ} 1'$ . Inland the coast gradually rises to about 1,000 feet. This hill, as well as the lowland, was almost free from ice. The ground appeared to be mainly clay, curiously cracked, and covered with moss, lichens, etc. The formation here were perpendicular strata of slate, with no fossils, but rich in crystals of sulphide of iron, and at one point traversed by large veins of quartz. Both animal and vegetable life were exceedingly poor and the former very tame. In the sea also the higher forms of life were scarce, but large Algæ and a large number of lower animals were obtained. On the 20th they weighed anchor, when drift ice was soon met with. After being obliged to sail in a northern and north-western direction they escaped, and the north-eastern extremity of the Taimyr peninsula ( $76^{\circ} 30'$  N. lat. and about  $113^{\circ}$  E. long.) was sighted. The coast is about fifty miles more to the west than noted on the charts. Here they found almost open water. It was observed that the bergs encountered were of fresh-water formation, indicating the existence of hilly islands to the north. Mountains of 2,000 to 3,000 feet in height were seen some distance away from the coast. There was now a great increase in marine animal life, all of pure arctic types. The island of Preobashenskoi was reached on the 24th, and found to have been laid down sixty miles too far west. From here eastward to the Lena an ice-free and comparatively warm sea was met with.

Arriving at the mouth of the Lena the two vessels parted company, and the *Vega* continued on her way, while the *Lena* ascended the river to Yakutsk, arriving there on the 21st of September.

As no further account of the former has been received, she is no doubt passing the winter in the ice, perhaps near the East cape, where Captain Campbell, of the steamer *Norman*, from

St. Lawrence bay, October 20, 1878, reports that the natives have seen a vessel.

So far this has been one of the most successful and important of modern exploring voyages. The chart of the voyage is published in the *Mittheilungen* for January, and is of great interest to geographers, as so many corrections have been made in the coast-line of the northern shores of Asia.

The discovery by the Norwegian Captain E. Johannsen, of a small island in long.  $81^{\circ}$  E. and lat.  $77^{\circ} 55'$  N., was made on the 3d of September last. He named it "*Ensomheden*" (Loneliness). The sea was open in every direction round it except to the south-east, where drift-ice was to be seen.

Already commerce has sprung up on the new route, and during the last season vessels were sent out from English, German, and Norwegian ports, and made more or less successful voyages to the Ob and Yenisei and back.

#### MICROSCOPY.<sup>1</sup>

NUCLEATED RED CORPUSCLES OF HUMAN BLOOD.—Many of the readers of the *AMERICAN NATURALIST* are familiar with the little instrument generally known as Beck's Vertical Illuminator, it is in fact a modification of a device invented by Prof. H. L. Smith, of Geneva, N. Y.

This illuminator was originally intended to be used in conjunction with medium power, dry objectives, of moderate angles, such as were formerly so much in vogue. Mr. Morehouse, a well known microscopist of Wayland, New York, fortunately discovered that by the conjoint use of the illuminator with immersion objectives of high balsam apertures, astonishing results might be secured, as for instance the resolution of the markings of podura and other insect scales, the striation of valves of *Frustulia saxonica*, *Surirella gemma* and similar "difficult" diatoms, under amplifications of 3000 and 4000 diameters, and as a matter of course, by reflected light.

Mr. Morehouse promptly informed me of his results, and I immediately repeated his experiments, and with perfect success; I also devised a modification, consisting of an adjustable shutter, regulating the admission of light, thus greatly improving the brilliancy of the objects, accompanied with marked increase of resolving power, and with the instrument thus modified I had no difficulty in obtaining beautiful displays of the Nobert 19th band, the simultaneous exhibition of the long and transverse striæ of *Frustulia saxonica*, etc., under powers of three and four thousand diameters.

Desiring to test the vertical illuminator over histological preparations, I thus examined a slide of human blood, improvised for the occasion, and was astonished to find about three-fourths of

<sup>1</sup> This department is edited by Dr. R. H. Ward, Troy, N. Y.